

REMARKS/ARGUMENTS

Applicants amended claims 5, 19, and 33 to clarify the claim language concerning the “at least one message packet”.

Applicants amended claim 37 to change the dependency to claim 36, which provides antecedent basis for certain elements in claim 37.

1. Claims 1-7, 11-13, 15-21, 25-27, 29-35, and 39-41 are Patentable Over the Cited Art

The Examiner rejected claims 1-7, 11-13, 15-21, 25-27, 29-35, and 39-41 as obvious (35 U.S.C. §103) over Pettus (U.S. Patent No. 6,223,217) in view of Talluri (U.S. Patent No. 6,615,383). Applicants traverse.

Claims 1, 15, and 29 concern allowing communication among processing nodes in a system, and require: receiving, in a source node, a request from a source object executing in the source node to send a message to a destination object executing in a destination node, wherein each node includes a processor capable of multitasking multiple program objects and a communication interface to transmit and receive data with the other nodes; determining, in the source node, whether the destination node and source node are a same node; invoking an operating system command in the source node to transmit the message to the destination object within the source node if the destination node is the source node; and if the destination node is not the source node, performing: (i) transmitting, with the source node, the message to the destination node through the communication interface; and (ii) invoking an operating system command in the destination node to transmit the message to the destination object within the destination node.

The Examiner acknowledged that Pettus does not teach the claim requirements of invoking an operating system command in the source node to transmit the message to the destination object within the source node if the destination node is the source node and invoking an operating system command in the destination node to transmit the message to the destination object within the destination node. The Examiner cited portions of Talluri as teaching these claim requirements. (Third Office Action, p. 3) Applicants traverse.

The Examiner cited message sending procedure 348 as preferably implemented as part of operating system 340 as teaching the claim requirement of invoking an operating system command in the source node to transmit the message to the destination object within the source

node if the destination node is the source node. The Examiner further cited col. 11, lines 3-20 and col. 13, lines 5-45 of Talluri with respect to this claim requirement of invoking operating system commands to transmit from a source node to a destination node that is the same node or different as the source node. (Second Office Action, pgs. 3-4) Applicants traverse.

The cited col. 13 describes the cited message sending procedure 348, which is described as part of the operating system 340, for sending messages to a remote node. However, the claims require invoking an operating system command in the source node to transmit the message to the destination object within the source node if the destination object is in the source node. The cited col. 13 does not teach or suggest this claim requirement because the cited procedure 348 is used to send a message to a remote node, not to a destination object within the source node as claimed.

Further, the claims also require invoking the operating system command in the destination node to transmit the message to the destination object within the destination node. The cited col. 13 does not teach or suggest this claim requirement because the cited procedure 348 is used to send a message to a remote node. Nowhere does the cited procedure 348 and discussion thereof in the cited col. 13 anywhere teach or suggest that the cited procedure 348 is invoked in the destination node to transmit the message to the destination object in the destination node. Instead, the cited col. 13 and message sending procedure 348 is used to send the message to a remote node, not to a destination object in the node in which the procedure is executing.

The cited col. 11, lines 3-20 of Talluri discusses an OpenBarrier and CloseBarrier procedures which differ from a remote read operation. The OpenBarrier procedure does not block continued operation of the executing thread whatsoever; and the CloseBarrier procedure blocks operation of the executing thread only until all pending remote write operations by the sending system's network interface (NIC card) have completed. Talluri mentions that the OpenBarrier procedure is called after the data to send is marshaled in a local buffer (Talluri, col. 10, lines 60-62). Once the OpenBarrier procedure is called, a remote write is performed to write the contents of the send buffer to the global addresses assigned to the receive buffer, to cause the sending node's communication interface to transmit the data being written. (Talluri, col. 11, lines 35-52).

The cited col. 11 thus discusses a procedure called to transmit a message to the remote location. Nowhere does this cited col. 11 teach that this OpenBarrier procedure is an operating system command that is invoked to transmit the message to the destination object if the source node and destination node are the same. Instead, the cited OpenBarrier procedure is used to write the contents to the remote location. Further, nowhere does the cited col. 11 teach that the OpenBarrier procedure is invoked in the destination node to transmit the message to the destination object when the source node and destination node are different. Instead, the cited col. 11 mentions that the OpenBarrier procedure is invoked on the source node, not the destination node. Thus, nowhere does the cited col. 11 teach or suggest the claim requirements of an operating system command invoked on the source node or destination node depending on the determination of whether the source node and the destination node are the same node.

The Examiner found that it would be obvious to combine Pettus and Talluri. However, even if one were to make this combination, the cited combination still does not teach or suggest all the claim requirements because the cited Talluri does not teach the invoked operating system command as claimed, and thus does not overcome the deficiencies of Pettus.

Accordingly, claims 1, 15, and 29 are patentable over the cited art because the cited Pettus and Talluri, alone or in combination, do not teach or suggest the additional requirements of these dependent claims.

Claims 2-7, 11-13, 16-21, 25-27, 30-35, and 39-41 are patentable over the cited art because they depend from one of claims 1, 15, and 29, which are patentable over the cited art for the reasons discussed above. Moreover, the below discussed claims provide additional grounds of patentability over the cited art.

Claims 2, 16, and 30 depend from claims 1, 15, and 29 and further recite that there is a message queue associated with each object in each node, and wherein the invoked operating system command in the source node transmits the message to the message queue associated with the destination object.

The Examiner cited col. 11, lines 49-67 of Talluri as teaching the claim requirement of a message queue associated with each object in each node. (Third Office Action, pg. 4)
Applicants traverse.

The cited col. 11 mentions a CloseBarrier procedure that is called. If a return code of 0 is returned indicating no errors, a trigger message is sent to Node B's network interface which

triggers the execution of a procedure in Node B for processing the received message by inspecting the received message queue.

Although the cited col. 11 discusses a receive message queue for Node B to which the message is sent, nowhere does this cited col. 11 anywhere disclose a message queue associated with each object in each node. Instead, the cited col. 11 mentions a receive message queue for messages that are sent to Node B.

The Examiner cited col. 13, lines 63 to col. 14, lines 42 of Talluri as teaching the claim requirement that the invoked operating system command in the source node (invoked if the source and destination nodes are the same) transmits the message to the message queue of the destination object. (Third Office Action, pg. 4) Applicants traverse.

The cited cols. 13-14 discuss that each computer that sends and receives messages includes an Ack message queue to keep track of the status of one message transmitted to another node. However, this claim requires that the operating system command is invoked to transmit a message to a message queue of a destination object in the same node as the source node. The cited cols. 13-14 concern an Ack queue to keep track of messages sent to another node, not a message queue to store a message sent to a destination object in the same node as the source node.

Accordingly, claims 2, 16, and 30 provide additional grounds of patentability over the cited art because the cited Pettus and Talluri, alone or in combination, do not teach or suggest the additional requirements of these dependent claims.

Claims 4, 18, and 31 depend from claims 3, 17, and 30 and further require that the communication interface comprises a bus and wherein including the address of the destination node in the message causes the destination node to read the at least one message packet transmitted on the bus.

The Examiner cited col. 11, lines 20-35 of Talluri as teaching the additional requirements of these claims. (Third Office Action, pg. 5) Applicants traverse.

The cited col. 11 mentions that the barrier instructions monitor error count values maintained by the packet level transport hardware and software. The packet level transport hardware and software detect transmission errors, channel availability and NIC card errors, and increment an error counter.

Although the cited col. 11 discusses transmitting packets and detecting errors, the Examiner has not shown where the cited col. 11 teaches that the source node includes the address of the destination node in the message that causes the destination node to read the message packet transmitted on the bus. Further, the cited col. 11 does not teach the combination that the message packet includes the requirements of the intervening claims 3, 17, and 31 that the message packet includes the determined address of the destination node and the address of the destination object.

Accordingly, claims 4, 18, and 31 provide additional grounds of patentability over the cited art because the cited Pettus and Talluri, alone or in combination, do not teach or suggest the additional requirements of these dependent claims.

Claims 5, 19, and 35 depend from claims 2, 16, and 30 and further require that sending the message to the destination object in the destination node comprises: determining, in the destination node, the destination object for the at least one message packet; and extracting, in the destination node, the message from the message packet, wherein the invoked operating system command in the destination node transmits the message to the message queue associated with the destination object.

The Examiner cited col. 13, line 63 to col. 14, line 42 of Talluri as teaching the requirement of invoking the operating system command in the destination node to transmit the message to the message queue associated with the destination object. (Third Office Action, p. 5) Applicants traverse.

As discussed, the cited cols. 13-14 mentions that an Ack message queue keeps track of the status of one message transmitted to another node. Nowhere do the cited cols. 13-14 teach invoking an operating system command in the destination node that is used to transmit the message to the message queue associated with the destination object within the destination node. Instead, the cited cols. 13-14 mention an Ack message queue used to keep track of messages sent to another node, not the claim requirement of sending messages in the same destination node to a message queue associated with the destination object.

Accordingly, claims 5, 19, and 35 provide additional grounds of patentability over the cited art because the cited Pettus and Talluri, alone or in combination, do not teach or suggest the additional requirements of these dependent claims.

Claims 6, 20, and 34 depend from claims 1, 15, and 29 and further require: invoking an operating system command, with the source object, to send the message to a message queue associated with a source network object in the source node; determining, with the source network object, an address of the destination node that addresses the destination node when transmitting messages through the communication interface; generating, with the source network object, at least one message packet including the message, the determined address of the destination node, and an address of the destination object; transmitting, with the source network object, the at least one message packet to the destination node over the communication interface; and receiving, with a destination network object, the at least one message packet, wherein the destination network object invokes the operating system command in the destination node to transmit the message to a message queue associated with the destination object in the destination node.

The Examiner cited col. 13, line 63 to col. 14, line 42 of Talluri as teaching the claim requirement that the destination network object invokes the operating system command in the destination node to transmit the message to a message queue associated with the destination object in the destination node. (Third Office Action, pg. 6) Applicants traverse.

As discussed, the cited cols. 13-14 mentions that an Ack message queue keeps track of the status of one message transmitted to another node. Nowhere do the cited cols. 13-14 teach that a destination network object that receives a message packet from another node invokes the operating system command to transmit the message to a message queue to the destination object within the destination node. Instead, the cited cols. 13-14 discuss how a message queue keeps track of the status of messages transmitted to another node. Nowhere does this teach or suggest the claim requirements of invoking an operating system command in a destination node to transmit a message in the destination node to the message queue of the destination object.

Accordingly, claims 6, 20, and 34 provide additional grounds of patentability over the cited art because the cited Pettus and Talluri, alone or in combination, do not teach or suggest the additional requirements of these dependent claims.

Claims 11, 25, and 39 depend from claims 1, 15, and 29 and further require that each object is assigned a unique object identifier in the system, and wherein the unique identifier is used within all nodes to identify the destination object to receive the message.

The Examiner cited col. 9, lines 40-55 of Talluri as teaching the additional requirements of these claims. (Third Office Action, pg. 6) Applicants traverse. (Applicants note that the

Examiner says that “Pettus teaches” in the body of paragraph 12, but then cites to Talluri. For this reason, Applicants distinguish the claims from the cited Talluri).

The cited col. 9 of Talluri mentions a message has a header and body, and has a sequence number or equivalent unique identifier included in each message.

Although the cited col. 9 discusses a unique message identifier, nowhere does this cited col. 9 teach or suggest that each object is assigned a unique identifier in the system that is used within all nodes to identify the destination object to receive the message. Instead, the cited col. 9 discusses a message identifier, not a unique object identifier used in all nodes. Thus, the cited Talluri does not teach that the same identifier is used to identify the destination object when the destination and source nodes are the same as well as when they are different.

Accordingly, claims 11, 25, and 39 provide additional grounds of patentability over the cited art because the cited Pettus and Talluri, alone or in combination, do not teach or suggest the additional requirements of these dependent claims.

2. Claims 8-10, 14, 22-24, 28, 36-38, and 42 are Patentable Over the Cited Art

The Examiner rejected claims 8-10, 14, 22-24, 28, 36-38, and 42 as obvious (35 U.S.C §103(a)) over Pettus and Talluri and further in view of Lea (U.S. Patent No. 6,349,352). Applicants traverse.

First off, these claims are patentable over the cited art because they depend from one of claims 1, 15, and 29, which are patentable over the cited art for the reasons discussed above. Moreover, the following discussed dependent claims provide additional grounds of patentability over the cited art.

Claims 10, 23, and 38 depend from claims 1, 15, and 29 and further requires that the system comprises a storage library system, and the electro-mechanical component comprises a component of a storage library system.

The Examiner cited col. 16, lines 20-25 of Lea as teaching the requirements of these claims. (Office Action, pg. 11). Applicants traverse.

The cited col. 16 mentions that a high level UI library provides components used by device modules to build UIs for their corresponding devices. “UI” refers to a user interface. (Lea, col. 13, line 14).

Nowhere does the cited Lea teach that the system comprises a storage library system and that a component node for an electro mechanical component comprises a component of a storage library system. There is no teaching or suggestion in the cited Lea or Pettus concerning the use and arrangement of nodes and components as claimed for a storage library system. The Examiner has also not provided any motivation to use the claimed system with a storage library system.

Accordingly, claims 10, 23, and 38 provide additional grounds of patentability over the cited art because the additional requirements of these claims are not disclosed in the cited Pettus.

3. Added Claims 43-48 are Patentable Over the Cited Art

Added claims 43, 45, and 47 depend from one of claims 1, 15, and 29 and further require that the operating system command invoked to transmit the message to the destination object if the destination node is the source node and if the destination node is not the source node comprises a same operating system function.

The added requirements of these claims are disclosed on at least pg. 10, lines 17-20 and pg. 12, lines 5-8 of the Specification, which discloses that the RTOS queue message function of the RTOS operating system is used to send the message to the queue of the destination object when the source node and destination nodes are and are not the same.

Added claims 44, 46, and 48 depend from claims 43, 45, and 47 and further require that the operating system command invoked in the source node in response to determining that the destination node and the source node are the same queues the message in a message queue of the destination object, and invoking the operating system command in the source node to queue the message in a communication interface object queue in response to determining that the destination node is not the source node, wherein a communication interface object transmits the message from the communication interface object queue to the destination node.

The added requirements of these claims are disclosed on at least pg. 10, lines 17-26 and pg. 12, lines 5-8 of the Specification.

Applicants submit that these added claims 43-48 are patentable over the cited art because they depend directly or indirectly from base claims 1, 15, and 29, which are patentable over the cited art for the reasons discussed above, and because the additional requirements of these claims

in combination with the base and any intervening claims provide further grounds of patentability over the cited art.

Conclusion

For all the above reasons, Applicant submits that the pending claims 1-48 are patentable over the art of record. Applicants submit herewith the fee for the added claims. Nonetheless, should any additional fees be required, please charge Deposit Account No. 09-0466.

The attorney of record invites the Examiner to contact him at (310) 553-7977 if the Examiner believes such contact would advance the prosecution of the case.

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By: /David Victor/

David W. Victor
Registration No. 39,867

Please direct all correspondences to:

David Victor
Konrad Raynes & Victor, LLP
315 South Beverly Drive, Ste. 210
Beverly Hills, CA 90212
Tel: 310-553-7977
Fax: 310-556-7984